26.2312
9,3120 (1003, 1137, 1140)

S/109/60/005/008/006/024
E140/E555

AUTHORS: Dyubua, B.Ch. and Popov, B.N.

TITLE: Certain Emission and Adsorption Properties of the System W-O-Ba

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol.5, No.8, pp.1233-1240

TEXT: The present study is motivated by the search for film cathodes resistant to residual-gas poisoning. The system W-O, W-Ba, W-O-Ba were studied in a range of oxygen pressures between 10^{-9} and 10^{-5} mm Hg. Oxygen was introduced into the vacuum system either by thermal decomposition of copper-oxide in a nickel tube or by thermal decomposition of $KMnO_4$. Neither method affected the experimental results at pressures above 10^{-6} mm Hg. The behaviour of the system observed is explained by two reactions. At degrees of oxygen coating on W less than 0.4, the reaction

$$\langle W \rangle + \frac{1}{2}(O_2) \rightarrow \langle WO \rangle$$

is assumed. At degrees of coating greater than 0.5 the reaction

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S/109/60/005/008/006/024
E140/E555

$$\langle WO \rangle + O_2 \rightarrow \langle WO_3 \rangle \quad (1)$$

is assumed. These reactions are compared with the reaction

$$\langle W \rangle + \frac{3}{2}(O_2) \rightarrow \langle WO_3 \rangle$$

usually occurring in the formation of tungsten anhydride by the burning of tungsten in oxygen. The system W-O-Ba, having three components, is more complicated than the system W-O. The effects of oxygen reduce the probability of agglomeration of the adsorbed film, and the oxides of barium and tungsten can appear; interaction between them then leads to the formation of tungstates. At residual gas pressures of 5×10^{-9} mm Hg, monotonic increase of thermionic emission of tungsten with increased degree of barium coating takes place. The appearance of extremal values of emission current on the activation curve is connected with the presence of oxygen. At oxygen pressures of the order of 5×10^{-7} mm Hg the thermionic emission of the system W-O-Ba is unstable. A slight

S/109/60/005/008/006/024
E140/E555

Certain Emission and Adsorption Properties of the System W-O-Ba

increase of oxygen pressure leads to a very sharp decrease of emission current. Acknowledgments are made to L. I. Dmitriyeva for her assistance in the experiments. There are 12 figures and 14 references: 6 Soviet and 8 non-Soviet.

SUBMITTED: December 21, 1959

Card 3/3

L0399
S/109/62/007/009/008/018
D409/D301

AUTHORS: Dyubua, B.Ch., and Popov, B.N.

TITLE: Metals with high oxygen stability of thermionic emission

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 9, 1962, 1556 - 1565

TEXT: The stability towards oxygen of the thermionic emission of metals (both pure and coated by an adsorbed Ba-layer) was experimentally investigated. The studied metals -- rhodium, iridium, platinum, rhenium, titanium, zirconium and hafnium -- have greater emission stability towards oxygen than tungsten. The experimental apparatus is described. The experimental lamp was evacuated to a pressure of 3 · 10-9 mm Hg. The cathode temperature was determined by means of an optical micropyrometer. First, the system metal-oxygen was investigated. Heating of the metals at maximum possible temperatures, is accompanied by stabilization of their emission properties. For all the metals investigated, with the exception of platinum, stabilization was attained after 15-20 minutes; in the case
Card 1/3

APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000411810014-1"

of platinum, it took 200 minutes. Small temperature-variations (50-60°K) led (in all the metals except platinum) to an almost immediate change in emission. Adsorption of oxygen on the platinum surface can lead to a decrease or to an increase in emission; this depends on the temperature and pressure. For convenience, the metals are divided into two groups: 1) Rhodium, iridium, platinum and rhenium; 2) titanium, zirconium and hafnium. In the first group, a temperature rise leads initially to a decrease in the stability of emission. A further rise in temperature leads to a decrease in the equilibrium concentration of oxygen and to an increase in the stability of emission. Among the metals of the second group, zirconium and hafnium are initially more affected by oxygen. The kinetic processes are apparently the main factors, determining the stability of emission. If absorption is disregarded, then the oxygen concentration at the surface is mainly determined by the following processes: Chemisorption of oxygen, the reaction of oxygen with the metal surface (the formation of oxides), desorption of the reaction products. The rate of oxidation should increase from metal to metal in the following order: W, Ti, Zr, Hf. An investigation of the system metal-oxygen-barium showed that titanium, zirconium and hafnium

APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000411810014-1"

placed in a barium flow, also have greater emission stability than tungsten. The stability of rhenium-barium is lower than that of platinum, rhodium and iridium in barium; rhenium is however more advantageous by its high melting point and strength. It is concluded that the metals Rh, Ir, Pt, Re, Ti, Zr and Hf (both pure and coated with Ba) are more stable in emission towards oxygen than W. The use of these metals for bariated cathodes depends on the solution of the problem of applying the barium to the emitting surface. The theoretical study of the effect of oxygen on the emission of the metals, showed that increased stability of emission can be related to two factors: low rate of oxygen chemisorption or high rate of desorption of metal oxides. There are 8 figures and 2 tables.

SUBMITTED: December 29, 1961

APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000411810014-1"

S/109/62/007/009/009/018
D409/D301

AUTHORS: Dyubua, B.Ch., Pekarev, A.I., Popov, B.N., and Tylkina, M.A.

TITLE: Thermionic emission of tungsten-titanium and tungsten-hafnium alloys and its dependence on oxygen pressure

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 9, 1962, 1566 - 1573

TEXT: The dependence of the work function of W-Ti and W-Hf alloys on their composition was investigated. It was found that the work function of solid solutions is lower than that of pure metals. Solid solutions and chemical compounds should be considered as new emitters whose properties differ from the properties of pure metals. As the original materials, tungsten powder of grade ВЧ (VCh) (highly pure) was used, titanium of grade ИМП-1А (IMP-1A), and chemically-pure hafnium. The composition of the alloys was determined by chemical analysis. The alloys underwent X-ray structural and metallographic analysis. The lattice parameters of the solution of hafnium in tungsten were calculated; it was found that the value of
Card 1/3

the lattice parameter increases from 3.160 to 3.185 KX. The thermionic emission of the alloys was measured by means of an experimental lamp. For the W-Ti alloys, three values of the work function were obtained, in addition to the work functions of the pure metals. These values are roughly similar (3.6 - 3.75 ev). The dependence of the thermionic emission on the oxygen pressure, was investigated for both alloys without Ba-coating and with Ba-coating. In the first case, the behavior of the alloys is as follows: 1) If the oxygen pressure is increased, the thermionic emission changes in the same way as that of the low melting-point component; 2) the critical oxygen pressure is higher for the alloys (at equal temperatures), than for pure tungsten, but lower than that of the component metals. In the case of Ba-coated alloys, the following qualitative results were obtained from the experiments: 1) Under the action of the oxygen, the emission of the alloys initially increases, and then decreases (similar to the emission of tungsten); but the increase in emission is several hundredfold less than that of tungsten. 2) In the case of the alloys, the drop in emission starts at higher oxygen pressures than for pure tungsten, but at lower pressures than for pure titanium and hafnium. The authors also calculated the work functions of the alloys. The calculated and experimental values were in good agreement. A formula was derived, connecting the change in the lattice parameter a of the solid solution, with the work function:

$$W_a = c\,\frac{e^2}{2a}\,. \qquad (2)$$

This formula is qualitatively correct for the system W-Hf, but it does not hold for the system W-Ti. It is concluded that the work function of solid solutions of metals is lower than that of the pure metals; this difference is in some cases $\sim$1 ev. The drop in thermionic emission of the alloys, due to the oxygen, is intermediate to that of the components and entirely disappears at temperatures at which the emission attains a magnitude which is of interest in practice. The process of poisoning of the alloys cannot be explained by assuming that the processes of chemisorption, oxidation and evaporation on the individual atoms, are independent. There are 5 figures and 1 table.

SUBMITTED: December 29, 1961

ACCESSION NR: AP4019833 S/0181/64/006/003/0757/0759

AUTHORS: Dyubua, B. Ch.; Yermolayev, L. A.

TITLE: Secondary electron emission in rhenium

SOURCE: Fizika tverdogo tela, v. 6, no. 3, 1964, 757-759

TOPIC TAGS: secondary electron emission, rhenium, TU 3 25 61 rhenium plate, degassing

ABSTRACT: The authors have determined the dependence of secondary electron emission on energy of the primary electrons for rhenium fused in argon and for rhenium plate, depending on the temperature to which the target is heated. This dependence is shown graphically in Fig. 1 on the Enclosure. A reproducible maximal value for the coefficient of secondary electron emission was obtained for rhenium: 1.6 at a primary-electron energy of 750 ev. This is not in agreement with the value normally given in the literature. It is natural to suppose that the initial drop in coefficient of secondary emission on heating the sample is due to degassing the target. A shift in the value of primary-electron energy is

APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000411810014-1"

ACCESSION NR: AP4019833

generally observed during degassing, the highest value of the coefficient being found at the higher energies. This shift is also observed during degassing of rhenium. The succeeding increase in coefficient of secondary emission may be associated with further purification of the target, both of adsorbed gas and of readily volatile impurities (K, Mg, and others). "The authors take this opportunity to express their thanks to Professor A. R. Shul'man for his discussion of the technique and results of the work and for valuable suggestions." Orig. art. has: 1 figure.

ASSOCIATION: none

SUBMITTED: 21Aug63 DATE ACQ: 31Mar64 ENCL: 01

SUB CODE: NP NO REF SOV: 006 OTHER: 003

Card 2/3

ACCESSION NR: AP4019833 ENCLOSURE: 01

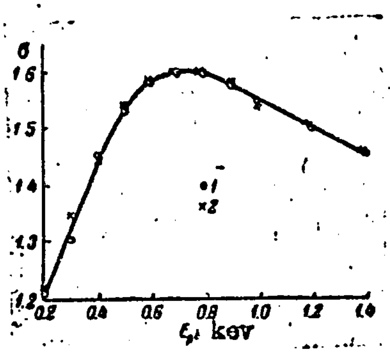

Fig. 1. Dependence of the coefficient of secondary electron emission (6) on primary-electron energy (E_p) for rhenium samples heated at temperatures above 2200K
1 - fused rhenium; 2 - rhenium plate.

Card 3/3

ACCESSION NR: AP4019834 S/0181/64/006/003/0760/0763

AUTHORS: Dyubua, B. Ch.; Yermolayev, L. A.

TITLE: Secondary electron emission in alloys of tungsten and hafnium

SOURCE: Fizika tverdogo tela, v. 6, no. 3, 1964, 760-763

TOPIC TAGS: secondary electron emission, alloy equilibrium diagram, tungsten, hafnium

ABSTRACT: The authors have determined the dependence of secondary electron emission on the energy of primary electrons for pure hafnium and five different alloys with tungsten. All measurements were made in sealed tubes. The electron beam had a tungsten cathode and was focused electrostatically. The dependence of the coefficient of secondary emission was found to lack uniformity. It passed through a maximum, the highest value of this coefficient, 1.55, being reached at 6% hafnium. The results of the measurements are summarized in Figs. 1 and 2 on the Enclosure. "The authors express their thanks to Professor A. R. Shul'man for discussing the work and offering valuable suggestions." Orig. art. has: 3 figures.

ASSOCIATION: none

Card 1/5

DYUBUA, B.Ch.; KULTASHEV, O.K.

Thermionic emission of some transition metal aluminides. Radiotekh. i elektron. 9 no.9:1725-1727 S '64. (MIRA 17:10)

DYUBUA, B.Ch.; KULTASHEV, O.K.; TSYGANOVA, I.A.

Work function of Nb-Re, Ti-Re, and Ta-Re alloys. Radiotekh. i elektron. 9 no.11:2061-2065 N '64. (MIRA 17:12)

APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000411810014-1"

L 12[illegible]-65 EWT(1)/EWG(k)/EWT(m)/EPA(sp)-2/EPF(n)-2/EPR/EPA[illegible]

[illegible]

[illegible] Mitrofanova, L.A., Nevskaya, [illegible]

TITLE: Dispenser tungsten-barium cathodes [Report, Tenth Conference on Cathode Electronics held in Kiev, 11-18 Nov 1963]

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v.28, no.9, 1964, 14[illegible]-1498

[illegible] emission, porous metal, tung[illegible] ...aluminate

[illegible] characteristics and life [illegible]
[illegible] calcium aluminate were [illegible]
[illegible] tungsten with grains from [illegible] ... of
[illegible] containing 2% paraffin was pressed into the ends of molybdenum cylin-
[illegible] paraffin was driven off by heating in [illegible]
[illegible] The porosity of the resulting [illegible] ...tungsten
[illegible] with $5BaO \cdot 2Al_2O_3 \cdot CaO$ [illegible]
[illegible] ranging in diameter from [illegible] ... and
[illegible] and pulsed operation at [illegible] ... from a
[illegible] anode capable of dissipating [illegible] ... ring

L 12041-65
ACCESSION NR: AP4045307

... keep the field uniform and to suppress ... stamina-
... of the cathode assembly. The cathode ... ured
... micropyrometer and a thermocouple, ... ined at
... better. The characteristics of ... of
... with anode potentials for which ... sible
... with currents up to 10 A/cm^2) ... tween
... obtained in pulsed and by continuous ... opera-
... luminous phenomena and large ... was op-
... anode potentials. Stable operation ... at high
... the currents were much lower ... uggest-
... large currents reported by ... and
... 264, 1952) may be due to ... The
... was somewhat larger than the ... a
... 1500 K. This is tentatively ascribed ... of the
... were conducted for 2000 hours ... large
... cathode operated at 1500 ... for
... the drop was from 8 to 7 A/cm^2 ... gen-
... the procedures available for ...
... respective advantages and disadvantages. Orig. art. has: 2 formulas

PM-43307

NR REF SOV

EWT(1)/EWG(k)/EWT(m)/EPA(sp)-2/EPF(c)/EPF(n)-2/EPR/EPA(w)-2/EEC(t)/

Yermolayev, L.A.

electron emission of alloys of

Tenth Conference on Cathode

Seriya fizicheskaya

titanium alloy

The coefficients of secondary electron emission of Re-W, Re-Ta and Re-Ti as functions of composition. The alloys were prepared by arc

electron bombardment from behind; the

ACCESSION NR: AP4049510

... opening for passage of the beam. Provision was made to bom- ...

... performed ...

... determined ...

... maximum value was ...

... the ...

... coefficient ... passed through a maximum at a composition of ...

... emission rose from ...

... then dropped ...

... this emission rose ...

... and remained ...

... It is ...

... concentrate in the surface layer ...

L 12042-65
ACCESSION NR: AP4045310

[illegible]red. Orig.art.has: 5 figures.

[illegible] 00

NR REF SOV: [illegible]

[illegible] 5

L 6927-66 EPF(n)-2/EPA(s)-2/EWT(m)/ETC/EWG(m)/EWP(b)/EWP(t) IJP(c)
ACCESSION NR: AP5015822 WW/JD/JG UR/0109/65/010/006/1161/1161
537.533.2

AUTHOR: Dyubua, B. Ch.

33

TITLE: Thermionic emission of some high-melt metals in barium vapor

SOURCE: Radiotekhnika i elektronika, v. 10, no. 6, 1965, 1161

TOPIC TAGS: thermionic emission

ABSTRACT: Current-density vs. temperature curves for W, Re, Rh, Ir, Zr, Ti, Hf, Mo, Ta, and Pt cathodes operating in a Ba stream of 10^{13} atoms per $cm^2\cdot sec$ in a vacuum of 5×10^{-9} torr are presented. Re is found promising for film-type cathodes. Zr may find wide usage as an anti-emission material. Orig. art. has: 1 figure.

ASSOCIATION: none

SUBMITTED: 05Aug64 ENCL: 00 SUB CODE: EC, MM

NO REF SOV: 003 OTHER: 001

Card 1/1 rds

L 9582-66 EWT(1)/EWT(m)/ETC/EPF(n)-2/EWG(m)/T/EWP(t)/EWP(b) IJP(c) JD/WW/
ACC NR: AP6000564 JG/AT SOURCE CODE: UR/0109/65/010/012/2200/2204

44,55 44,55
AUTHOR: Dyubua, B. Ch.; Stepanov, L. A.

ORG: none

58
B

TITLE: Thermionic emission of some metal-like compounds in barium vapor 27 18

SOURCE: Radiotekhnika i elektronika, v. 10, no. 12, 1965, 2200-2204

TOPIC TAGS: thermionic emission, electron tube cathode, barium, metal compound

ABSTRACT: Results are reported of an experimental investigation of thermionic emission 21,44,55 and adsorption, in a barium flow, of the following metals and their compounds: Ti, Zr, Mo, C, $TiSi_2$, $ZrSi_2$, $MoSi_2$, TiC, ZrC, Mo_2C, TiB_2, ZrB_2, Mo_2B_5. A special 6-cathode, 27 Mo-anode, 10^{-7}-torr electron tube was used for testing the above materials; the anode had ports through which Ba, supplied by a special source, flowed to the cathodes. Curves of emission-current density vs. temperature are presented. It was found that the carbides, borides, and silicides of the above metals have a lower emission than Mo but higher than Ti and Zr. Although carbides have a higher melt point than borides, the latter are more chemically stable. Carbides (melt point 3140—3530C), borides (2980—3040C), and silicides (1540—1700C) have low emission in the Ba flow and, therefore, can be recommended as anti-emission coatings. "The authors wish to thank G. V. Samsonov for his interest in the work and practical help." Orig. art. has: 4 figures. 44,55

Card 1/2 [03]

UDC: 537.583:546.431

L 9582-66

ACC NR: AP6000564

O

SUB CODE: 20,11/ SUBM DATE: 05Aug64/ ORIG REF: 009/ OTH REF: 006/ ATD PRESS: 4162

bek

Card 2/2

L 20335-66 EWT(1)/EWT(m)/EPF(n)-2/EWO(m)/T/EWP(t) IJP(c) JD/WW/JG/AT

ACCESSION NR: AP5015822

UR/0109/65/010/006/1161/1161
537.533.2

28
B

AUTHOR: Dyubua, B. Ch.

TITLE: Thermionic emission of some high melt metals in barium vapor

SOURCE: Radiotekhnika i elektronika, v. 10, no. 6, 1965, 1161

TOPIC TAGS: thermionic emission

ABSTRACT: Current-density vs. temperature curves for W, Re, Rh, Ir, Zr, Ti, Hf, Mo, Ta, and Pt cathodes operating in a Ba stream of 10^{13} atoms per $cm^2 \cdot sec$ in a vacuum of $5x10^{-7}$ torr are presented. Re is found promising for film-type cathodes. Zr may find wide usage as an anti-emission material. Orig. art. has: 1 figure.

ASSOCIATION: none

SUBMITTED: 05Aug64 ENCL: 00 SUB CODE: EC, MM

NO REF SOV: 003 OTHER: 001

Card 1/1

L 27713-66 EWT(m)/T/EWP(t)/ETI IJP(c) JD/JG

ACC NR: AP6012469 SOURCE CODE: UR/0181/66/008/004/1105/1109

AUTHOR: Dyubua, B. Ch.; Kultashev, O. K.; Gorshkova, L. V.

ORG: none

TITLE: Work function of solid solutions of tungsten with molybdenum and tantalum

SOURCE: Fizika tverdogo tela, v. 8, no. 4, 1966, 1105-1109

TOPIC TAGS: tungsten, molybdenum, tantalum, solid solution, work function, thermionic emission, temperature dependence

ABSTRACT: This is a continuation of earlier work (Radiotekhn. i elektron. v. 9, 2061, 1964 and earlier) and is aimed at explaining the reduction in the work function of tungsten solutions with metals having similar electronic and crystalline structures and nearly equal atomic radii (molybdenum and tantalum). The samples were prepared from pure ingredients in a helium atmosphere in a vacuum arc furnace in the form of flat discs. The work function was calculated from the measured thermionic emission at zero field ϕ, using the Richardson-Dushman formula. The work function was plotted as a function of the tungsten concentration (0—100%) and of the temperature (1300—2300K). The results point to the presence of two groups of solution, those with tungsten concentrations up to about 70%, and those with higher concentration. In the first group the work function remains constant in both the molybdenum and tantalum alloys (about 4.2 ev). In the second group the work function drops rapidly to a value lower than the work function of pure molybdenum or tantalum.

Card 1/2

L 27713-66

ACC NR: AP6012469

Other nonmonotonic changes are observed in the concentration dependence of the work function, brought about by differences in the heat treatment preceding the measurement. The work function is independent of the temperature in the first group and increases with temperature in the second. An analysis of several possible causes shows that the decrease in the work function is most likely due to the adsorption of the more volatile component (tantalum or molybdenum) on the surface of the alloy. This is borne out by certain analogies between the behavior of the solid solution and a coated cathode. Orig. art. has: 3 figures. [02]

SUB CODE: 20,18/ SUBM DATE: 19Aug65/ ORIG REF: 007/ OTH REF: 001/
ATD PRESS: 5001

L 27754-66 EWT(m)/EWA(d)/EWP(t)/ETI IJP(c) JD/JG

ACC NR: AP6015640 SOURCE CODE: UR/0413/66/000/009/0050/0050

21
B

INVENTOR: Dyubua, B. Ch.; Yermolayev, L. A.

ORG: none

TITLE: An antiemission alloy. Class 21, No. 181202
15

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 9, 1966, 50

TOPIC TAGS: antiemission alloy, rhenium alloy, carbon containing alloy

ABSTRACT: This Author Certificate introduces a rhenium-base antiemission alloy used for vacuum tubes. In order to reduce the electron emission, 0.1—5 at% carbon is added to the alloy. [WW]

SUB CODE: 11/ SUBM DATE: 07Jan65/ ATD PRESS: 5001

Card 1/1 90 UDC: 621.385.032.2.621.315.55

L 07093-67 EWP(e)/EWT(m)/EWP(w)/EWP(t)/ETI IJP(c) JD/JG/AT/WH
ACC NR: AP6019005 SOURCE CODE: UR/0109/66/011/006/1149/1150

AUTHOR: Dyubua, B. Ch.; Yermolayev, L. A.; Kultashev, O. K.

70
B

ORG: none

TITLE: Emission properties of Pt-Th, Ir-Th, Os-Th and Re-Th alloys

SOURCE: Radiotekhnika i elektronika, v. 11, no. 6, 1966, 1149-1150

TOPIC TAGS: electron emission, emissivity, thermionic emission, secondary electron emission, THORIUM ALLOY

ABSTRACT: The results of an experimental investigation of thermionic and secondary-electron emission of high-melt alloys are reported. The microsections of the test specimens were two phase: Re_2Th, Os_2Th, Ir_5Th, and Pt_5Th (A. E. Dwight, Trans. Am. Soc. Metals, 1961, 53, part 1, 479; J. R. Thomson et al., Common Metals, 1964, 6.1, 3). The results are tabulated below:

Card 1/2 UDC: 669.231/233.5.018.5:621.385.7

L 07093-67

ACC NR: AP6019005

0

Alloy	Work function 1600K ev	Tempr. coeff. ev/1K	Max. coeff. sec.-el. emiss.
Pt — Th 2%	4,00	$0 \cdot 10^{-4}$	1,57
Ir — Th 2%	3,90	$4 \cdot 10^{-4}$	2,00
Os — Th 2%	3,08	$<10^{-4}$	2,07
Re — Th 2%	3,09	$<10^{-4}$	1,95

Orig. art. has: 1 table.

SUB CODE: 20, 09 / SUBM DATE: 17Nov65 / ORIG REF: 006 / OTH REF: 003

Card 2/2 ZC

L 07092-67 EWT(m)/EWP(w)/EWP(t)/ETI IJP(c) JD/JG
ACC NR: AP6019006 SOURCE CODE: UR/0109/66/011/006/1150/1151

AUTHOR: Vasil'yeva, Ye. V.; Dyubua, B. Ch.; Yermolayev, L. A.; Kultashev, O. K.

75
B

ORG: none

TITLE: Emission properties of Pt-La, Ir-La, Os-La alloys
18 27 27 27 27

SOURCE: Radiotekhnika i elektronika, v. 11, no. 6, 1966, 1150-1151

TOPIC TAGS: electron emission, emissivity, thermionic emission, secondary electron emission, LANTHANUM, ALLOY, PLATINUM CONTAINING ALLOY, IRIDIUM CONTAINING ALLOY, OSMIUM CONTAINING ALLOY

ABSTRACT: The results are reported of an experimental investigation of thermionic and secondary-electron emission of Os-La (with a Laves phase Os_2La), of Pt-La (with a Pt_5La phase), and of Ir-La (with an Ir_5La phase) alloys: see A. E. Dwight, Trans. Am. Soc. Metals, 1961, 53, part 1, 479; T. H. Geballe

Card 1/2 UDC: 669.231/233.5.018.5:621.385.7

L 07092-67

ACC NR: AP6019006

et al., Phys. Rev., 1965, 137, A119. The results are tabulated below:

Alloy	Work function 1600K ev	Tempr. coeff. ev/1K	Max. coeff. sec.-el. emiss.
Pt — La 0,5%	4,01	$2\cdot10^{-4}$	1,73
Ir — La 0,5%	2,69	$4\cdot10^{-4}$	2,47
Os — La 0,5%	2,71	6·10[illegible]	2,20

Orig. art. has: 1 table.

SUB CODE: 20, 09 / SUBM DATE: 17Nov65 / ORIG REF: 002 / OTH REF: 002

Card 2/2 ZC

L 30409-66 EWT(m)/EWP(t)/ETI IJP(c) WW/JD/JG
ACC NR: AP6010406 SOURCE CODE: UR/0126/66/021/003/0396/0402

97
95
B

AUTHOR: Dyubua, B. Ch.; Kultashev, O. K.

ORG: none

TITLE: Work function of W-Hf, Ta-Hf, Nb-Hf, Re-Zr, and W-Re alloys

SOURCE: Fizika metallov i metallovedeniye, v. 21, no. 3, 1966, 396-402

TOPIC TAGS: work function, tungsten, alloy, hafnium alloy, tantalum alloy, niobium alloy, rhenium alloy, zirconium alloy, REFRACTORY METAL, THERMIONIC EMISSION

ABSTRACT: The paper presents data on the work function of refractory metals in which various amounts of hafnium and zirconium have been dissolved. The work function was determined from the Richardson-Dushman equation for $A = 120.4$ A/cm^2 deg^2. The thermionic emission measurements were carried out in a vacuum of $10^{-8} - 10^{-9}$ mm Hg. The phase composition of the alloys was determined by microstructural analysis. The work function of pure Re, Ta, Nb, and Zr was shown to remain constant with changing temperature. The addition of hafnium and zirconium was found to decrease the work function of the refractory metals. The cause of this effect is thought to be the adsorption

Card 1/2 UDC: 537.533.2:539.292

L 30409-66
ACC NR: AP6010406

2

of hafnium and zirconium atoms on the surface of the solid solution. In the region of the σ phase of the W-Re alloy an increase in work function up to 5.0 eV was observed. This is attributed to a possible adsorption of rhenium. The authors thank Ye. M. Savitskiy and M. A. Tylkina for providing the ingots of the alloys studied and for their interest in this work. Orig. art. has: 8 figures. [08]

SUB CODE: 11 / SUBM DATE: 30Sep64 / ORIG REF: 008 / OTH REF: 001/ ATD PRESS: 5117

Card 2/2

DYUBURG, I., prepodavatel' (Irkutsk).

We study practical economics. Grazhd.av. 13 no.9:33 S '56.
(Economics--Study and teaching) (MLRA 9:11)

DYUBURG, I. (Irkutsk)

Instructors should know the theory of instruction and education.
Grazhd.av. 12 no.8:18 Ag '55. (MIRA 15:8)
(Aeronautics--Study and teaching)

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Iz. Ak. Nauk SSSR, Ser. Geograf. i Geofiz., No. 4, 1945

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"Formulae Characterizing the Change of the singularities of the baric field according to the second approximation of I. A. Kibel and some Deductions from their Analysis,"

Iz. Ak. Nauk SSSR, Ser. Geograf. i Geofiz., No. 4, 1945.

DYUBIUK,

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V. 2

Turbulent Exchange

48-134

Dubiuk, A. F. Konvektivnaya ... Meteorologiia i Gidrologiia, 3:14-25 1946. ...

The first "Solution without considering ...

The second "Solution with consideration of ...

takes 11 equations while the third "Solution ... is developed by means of 33 equations. Subject Heading: Convection theory.—M. R.

DYUBYUK, A.F.

Development and movement of ground level and upper-air pressure centers in view of I.A.Kibel's hydrodynamic theory. Trudy NIU. Ser. 2 no.24:13-27 '47. (MLRA 7:7)
(Atmospheric pressure)

DYUDYUK, A.F.

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2

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551.511

Diubiuk, A. F., K. vychisleniiu vertikal'nykh skorostei po poliu davieniia. [The calculation of vertical velocity from the field of pressure.] U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoi Sluzhby, Trudy Nauchno-issledovatel'skikh Uchrezhdenii, Ser. II, Sinopticheskaia Meteorologiia. No. 24:28-51, 1947. table, 155 eqs. DWB--A methamatical treatise using the methods of I. A. KIBEL', on the calculation of vertical velocities from the force of surface friction and of turbulent or interior friction. Cases of divergence, stationary cases. Subject Headings: 1. Dynamics of the atmosphere 2. Frictional effects.—M.R.

1. DYUBYUK, A. F.

2. USSR (600)

Calculating Wind According to the Pressure Field.

9. Meteorologiya i Gidrologiya, No. 3, 1949.
[redacted] Report U-2551, 30 Oct. 52.

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9. Monthly List of Russian Accessions, Library of Congress, November 1958, Uncl.

2

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5.4-94

Diubiuk, A. F. Izmenenie skorosti vetra s vysotoi [illegible] height.] Leningrad. Tsentral'nyi Institut Prognozov [illegible]

DLC—Equations of motion integrated assuming that [illegible] Solutions given for the following cases in Descartes [illegible] variable with height, 2) gradient constant with height [illegible] function of height and time [illegible] unsteady cases are given also in spherical coordinates [illegible] 2. Friction layer 3. Wind profile theory 4. Equations of motion [illegible]

DYUBYUK, A.F.

4

(4) Geo

Meteorological Abst.
Vol. 5 No. 1
Jan. 1954
Part 1
Structure and Physics
of the Atmosphere

5.1-125 ✓ 551.511

Diubiuk, A. F., Primenenie metoda integrala Fur'e k opredeleniiu vetra po poliu davleniia. [Application of Fourier's analysis for wind determination along the pressure field.] *U.S.S.R. Tsentral'nyi Institut Prognozov, Trudy,* 15(42):48-62, 1949. 3 refs., 105 eqs. DLC—Equations of motion are integrated considering the surface friction in the form of GOLDBERG and MOHN, disregarding in the first approximation the convective terms of acceleration and using the Fourier integral for the solution of these linearized differential equations. In a second approximation, the convective terms are introduced. In the second part of this entirely mathematical discussion, the internal friction is considered using the method of multiple integrals for the solution. *Subject Headings:* 1. Wind field computation 2. Fourier analysis 3. Dynamics of the atmosphere.—*A.A.*

Dyubuk K. A. F.

Dyubuk, A. F., and Monin, A. S. On ... systems of functions. ... 76, 337–340 (195?). (Russian)

The system of differential equations

$-q_i(x)u_i(x) + \lambda p_i(x)u_i(x)$

together with the boundary conditions ... $\sum a_{ij} u_j(0) = 0$ is considered. Here ... $< k_i(x) < \pi$, $k_i(x_i) < \pi$ ... For $i \neq j$ ... > 0. For $i < j < k$ ... problem is considered. ... with a reference to Courant and Hilbert, ... mathematischen Physik, Bd. I ... Kap. 6 ... established results.

... Reviews

SOV/ 124-58-5-5565

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 5, p 92 (USSR)

AUTHOR: Dyubyuk, A. F.

TITLE: On the Dependence of Wind and Vertical Velocity on the Pressure Field With Consideration of the Nonlinear Acceleration and the Internal-friction terms (Zavisimost' vetra i vertikal'noy skorosti ot polya davleniya pri uchete nelineynykh chlenov uskoreniya i vnutrennego treniya)

PERIODICAL: Tr. Leningr. gidrometeorol. in-ta, 1956, Nr 5-6, pp 312-320

ABSTRACT: The author solves a system of equations

$$\begin{aligned} u_t + uu_x + vu_y - \nu u_{zz} + l v &= - P_x \\ v_t + uv_x + vv_y - \nu v_{zz} - l u &= - P_y \end{aligned} \qquad (1)$$

which describes the wind distribution in the atmospheric boundary layer with a specified pressure gradient, a constant coefficient of turbulence ν, and the dropping of the wu_z and wv_z terms, respectively, in the left-hand portions of equation (1). Here u and v are the velocity components along the horizontal coordinates x and y, z is the height, t is the time, w is the

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SOV/ 124-58-5-5565

On the Dependence of the Wind and the Vertical Velocity Upon the Field (cont.)

vertical velocity component, l is the Coriolis parameter, $P_x = p_x/\rho$, $P_y = p_y/\rho$, p is the pressure, ρ is the density, and a subscript indicates the result of a differentiation with respect to the specified argument. The equations are written in a left-hand system of coordinates, a system opposite the one commonly used in dynamic meteorology. A method of solution for the system of equations (1) is suggested, viz., the determination of the u and v values; the method described by the author consists in finding the solution in the form of a series relative to a small parameter, which is then equated to unity. In substance this method is equivalent to the method of successive approximations; in the first approximation the convection derivatives in the first part of the equation (1) are disregarded; in the second approximation the value obtained from the first approximation is assigned to them; the process is repeated. The solution for each approximation is obtained in the form of an integral with time and height as the variables. For a stationary problem ($u_t = v_t = 0$) in which P_y and P_x are independent of the height (i.e., absence of thermal wind) the solution for every approximation is obtained in an implicit form. A numerical example to the extent of only the two first approximations is worked out for the last case. The first approximation defines the well-known Ekman-Okerblom solution. The addition of the second approximation encompasses, in particular, the influence of the crowding and spreading of the isobars across the flow

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SOV/ 124-58-5-5565

On the Dependence of the Wind and the Vertical Velocity Upon the Field (cont.)

on the vertical wind profile. More specifically, if the isobars become more tightly packed to the right of the flow (in the Northern Hemisphere, Transl. Ed. Note), then the wind deviation across the isobar is smaller and vice versa. On the basis of the solution obtained above expressions are worked out for the vertical velocity component with the aid of the equation of continuity. The influence of the spacing of the isobars on the vertical profile of this component is investigated. In all the calculations only the effect of a tighter (or less tight) isobar spacing is examined, while the effect of convergence (divergence) [of the isobars; Transl. Ed. Note] is not taken into consideration. Some concepts relative to the convergence [mathematically speaking; Transl. Ed. Note] of the proposed approximations method are offered.

L. S. Gandin

1. Wind--Mathematical analysis

Card 3/3

3.7-249

Dubluk, A. F., O vertikal'nykh dvizheniiakh v oblastiakh dvizhushchikhsia [illegible] [Vertical movements in the regions of moving fronts.] [illegible] Geofiz., No. 9:1091-1098, 1956. 2 figs., 2 tables [illegible]

[illegible]ing vertical velocities in a given field of pressure are applied [illegible] moving warm and cold fronts. Numerical [illegible]

Vertical velocities 2. Frontal zones.—From author's abstract.

[illegible]

SOV/124-57-8-9145

Translation from: Referativnyy zhurnal, Mekhanika, 1957, Nr 8, p 81 (USSR)

AUTHORS: Dogadkina, N. P., Dyubyuk, A. F.

TITLE: Vertical Velocities Within a Stationary Frontal Zone (Vertikal'nyye skorosti v oblasti statsionarnogo fronta)

PERIODICAL: Tr. Tsentr. in-ta prognozov, 1956, Nr 45(72), pp 65-73

ABSTRACT: The influence of friction in the frontal zone and the atmospheric surface layer on the formation of vertical air movements in the vicinity of a frontal surface is investigated. The case of stationary fronts (du/dt=dv/dt=0) is examined, for which the solution of the equation

$$\eta \frac{\partial^2 s}{\partial z^2} + i\ell s = \pi(z) \quad (\eta = \text{const}), \text{ where } (s = u + iv, \quad \pi(z) = \frac{1}{\rho}\left(\frac{\partial p}{\partial x} + \frac{\partial p}{\partial y}\right)$$

is sought for the following boundary conditions: 1) At the ground surface, adhesion (s=0); 2) at infinity, a finite velocity. Having written the solutions for u and v (s), the authors compute the derivatives $\partial u/\partial x$ and $\partial v/\partial y$ and determine the vertical velocity w from the equation of continuity. The formulas

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Vertical Velocities Within a Stationary Frontal Zone

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obtained are used to calculate roughly the vertical velocities on either side of the frontal surface for 50-m height intervals at various frontal elevations (0, 500, 700, and 1000 m). It is noted that the surface layer exerts a considerable influence on the vertical velocities in the frontal region at small frontal elevations.

V. P. Sadokov

Card 2/2

DYUBYUK, A.F.

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1904
AUTHOR DOBRYSMAN, E.M., DJUBJUK, A.F.
TITLE On the Solution of the Equation $\left(\frac{\partial^2}{\partial t^2} - \frac{\partial}{\partial t}\Delta - \Delta\right)u = f$
PERIODICAL Dokl.Akad.Nauk, 111, fasc.1, 55-58 (1956)
Issued: 1 / 1957

The present report supplies formal solutions of this equation for the CAUCHY problem and for a mixed problem. CAUCHY problem: With $t = 0$ it is assumed that $u=u_0(x,y,z)$; $\partial u/\partial t=u_1(x,y,z)$. By applying the usual CARSON-HEAVYSIDE operators to t, the following equation is obtained for the representation functions: $\Delta\bar{u} - (p^2/(p+1))\,\bar{u} = -\bar{F}(x,y,z;p)$. The rather complicated expression for $\bar{F}$ is explicitly given. The solution of this equation is written down in form of spatial potentials: $\bar{u} = (1/4\pi)\iint_{(S)} \bar{F}\,(M,p)\, e^{-pr/\sqrt{p+1}}\, ds$. Here M denotes a point with the coordinates (x_1,y_1,z_1), $\sqrt{r=(x-x_1)^2+(y-y_1)^2-(z-z_1)^2}$, and S denotes a sphere. This solution is then explicitly written down in a detailed manner. Next, the operators $p^N(e^{-pr/\sqrt{p+1}})/(p+1)$ with $N = 0,1,2$) are investigated. At first the case $N = 1$ is examined. Determination of the solution of the CAUCHY problem is followed step by step and the solution itself is explicitly written down. - The mixed problem is investigated for the half-space $z > 0$ with the conditions $t = 0$, $u = u_0(x,y,z)$, $\partial u/\partial t = u_1(x,y,z)$; $z = 0$, $\partial u/\partial z = 0$. Also in

Dokl.Akad.Nauk, 111, fasc.1, 55-58 (1956) CARD 2 / 2 PA - 1904

this case the CARSON-HEAVYSIDE operator is applied to t, whereupon $\Delta\bar{u}-(p^2/(p+1))\bar{u}=-(p^2/(p+1)u_0-p(u_1-\Delta u_0)/p+1)-\bar{f}(x,y,z;p)/(p+1)=F_1(x,y,z;p)$ is found. If u_0, Δu_0, u_1 and $\bar{f}(x,y,z;p)$ are represented in form of double FOURIER integrals, it is possible to write down the entire part of this equation in the form $\bar{F}_1(x,y,z;p) = \iint_{-\infty}^{\infty} e^{i(mx+ny)} u_{mn}(z;p)\, dm\, dn$. For $\bar{u}_{mn}$ a total differential equation of second order is obtained and the solution for $\bar{u}_{mn}$, which satisfies the conditions $z=0$, $du_{mn}/dz=0$ (with $z \to \infty$ u_{mn} is limited) is explicitly written down. After returning to u we obtain $\bar{u}=(1/(2\pi)^2)\iiiint_{-\infty}^{\infty}\int_0^{\infty}(1/2k)\left[e^{-k|z-z'|}+e^{-k(z+z')}\right]xF(x',y',z';p)e^{-im(x-x')-in(y-y')}$ $dz'dx'dy'dmdn$. After the introduction of new variables it is possible to carry out two integrations. From the result thus obtained one then returns to the original variable. The rather voluminous solution found in this manner is then explicitly written down. The method described is also suited for the case of the more general boundary condition $\alpha u + \beta\partial u/\partial z = R(x,y,z)$.

INSTITUTION: Central Institute for Prognoses.

KHRGIAN, A.Kh.; BOROVIKOV, A.M.; DZERDZEYEVSKIY, B.L.; DYUBYUK, A.F.; ZVEREV, A.S.; ZOLOTAREV, M.A.; KRICHAK, O.G.; KLEMIN, I.A.; PINUS, N.Z.; SELEZNEVA, Ye.S.; YASNOGORODSKAYA, M.M., red.; VLADIMIROV, O.G., tekhn.red.

[Cloud atlas] Atlas oblakov. Leningrad, Gidrometeor.izd-vo, 1957. 45 p. (MIRA 12:9)

1. Russia (1923- U.S.S.R.) Glavnoye upravleniye gidrometeorologicheskoy sluzhby.
(Clouds)

DYUBYUK, A.F.

Determining wind and vertical speed through pressure field by three equations of motion. Vest. Mosk.un.Ser.mat.mekh.astron.fiz. khim. 12 no.4:125-128 '57. (MIRA 11:5)

1.Kafedra fiziki atmosfery Moskovskogo gosudarstvennogo universiteta.
(Winds) (Differential equations)

DYUBYUK, A.F., professor.

Unusual auroral displays. Priroda 46 no.7:79-80 Jl '57.
(MIRA 10:8)

1.Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Auroras')

DYUBYUK, A.F., professor.

[illegible]

Storms and tornadoes. Priroda 46 no.7:80-84 Jl '57. (MIRA 10:8)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Storms) (Tornadoes)

AUTHORS: Perepelova, R.A., and Dyubyuk, A.F. SOV/55-58-1-12/33

TITLE: Determination of the Vertical Velocities in the Range of the Front of Heat (Raschet vertikal'nykh skorostey v oblasti teplogo fronta)

PERIODICAL: Vestnik Moskovskogo universiteta, Seriya fiziko-matematicheskikh i yestestvennykh nauk, 1958, Nr 1, pp 97-105 (USSR)

ABSTRACT: Starting from the linearized motion equations of a tenacious fluid the authors determine the vertical velocities of air currents. It is stated that within a small zone over a movable front of heat there is a strong increase of the flow directed to above. In greater hights the vertical velocity diminishes. After reaching the minimum there is again an increase; the process reminds to fading oscillations. An essential influence to these appearances has the angle of inclination and the velocity of the front of heat. There are 5 figures and 4 Soviet references.

ASSOCIATION: Kafedra fiziki atmosfery (Chair of Atmospheric Physics)

SUBMITTED: December 15, 1955

Card 1/1

Dyubyuk, A. F.

49-58-2-15/18

AUTHOR: Dyubyuk, A. F.

TITLE: The Determination of the Wind in a Pressure Field, Taking into Account the Friction of Vertical and Horizontal Mixing. (Opredeleniye vetra cherez pole davleniya pri uchete treniya vertikal'nogo i gorizontal'nogo peremeshivaniya.)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Geofizicheskaya, 1958, Nr.2, pp. 274-276. (USSR)

ABSTRACT: 1. The non-stationary case. In Ref.1 was given the solution to the problem of determining the wind through a pressure field, starting from the equations of motion

$$u_t - \nu_1 u_{zz} - \nu_2(u_{xx} + u_{yy}) + lv = -\frac{p_x}{\rho} \equiv - P_x,$$

$$v_t - \nu_1 v_{zz} - \nu_2(v_{xx} + v_{yy}) + lu = -\frac{p_y}{\rho} \equiv - P_y, \quad \text{(Eq.1)}$$

where $l = 2\omega \sin \varphi$ is the Coriolis parameter; ν_1 and ν_2 are the coefficients of virtual vertical and

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side (horizontal) friction, and it was assumed that P_x and P_y are functions only of the time t:

p is the atmospheric pressure; ρ is the air density, and u and v are the components of wind velocity. Here it will be assumed that P_x and P_y are arbitrary functions of the coordinates x, y, z of the time t. New variables ξ and η are introduced by the formula

$$\xi = \sqrt{\frac{\nu_1}{\nu_2}}\, x, \qquad \eta = \sqrt{\frac{\nu_1}{\nu_2}}\, y. \qquad \text{(Eq.2)}$$

With the notation

$$\Delta = \frac{\partial^2}{\partial \xi^2} + \frac{\partial^2}{\partial \eta^2} + \frac{\partial^2}{\partial z^2},$$

 we obtain in place of Eq.1

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$$u_t - \nu_1 \Delta u + lv = -P_1, \quad v_t - \nu_1 \Delta v - lu = -P_2, \tag{Eq.3}$$

where P_1 and P_2 correspond to the functions P_x and P_y after the change of variables given by Eq.2.

In order to avoid complex quantities an approach is employed which has been used in Ref.2. Instead of u and v, new variables R and S are introduced by the formulae

$$u = R \cos lt + S \sin lt, \quad v = R \sin lt - S \cos lt. \tag{Eq.4}$$

Then, with the notation

$$P_1 \cos lt + P_2 \sin lt = \varphi, \quad P_1 \sin lt - P_2 \cos lt = \psi, \tag{Eq.5}$$

it is easy to obtain from Eq.3:

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$$R_t - \nu_1 \Delta R = -\varphi, \quad S_t - \nu_1 \Delta S = -\psi. \tag{Eq.6}$$

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The Determination of the Wind in a Pressure Field Taking into Account the Friction of Vertical and Horizontal Mixing.

For boundary conditions at $z = 0$ we take $u = v = 0$, i.e. $R = S = 0$, and for z tending to infinity the boundedness of u, v and consequently R, S, is used.

An operational method can be used to solve Eq.6 by applying the Laplace-Carson transformation with respect to t, and the Fourier transformation with respect to x and y, as was done in Ref.3. The solution for R can then be written in the form

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The Determination of the Wind in a Pressure Field Taking into Account the Friction of Vertical and Horizontal Mixing

$$R = -\frac{1}{(4\pi\nu_1)^{3/2}} \int_{-\infty}^{+\infty}\int\int_{0}^{\infty}\int_{0}^{t} \varrho(\xi', \eta', z', t') \left[e^{-\frac{r^2}{4\nu_1(t-t')}} - e^{-\frac{r_1^2}{4\nu_1(t-t')}} \right] \frac{dt'\, dz'\, d\xi'\, d\eta'}{(t-t')^{3/2}} +$$

$$+ \frac{1}{(4\pi\nu_1 t)^{3/2}} \int_{-\infty}^{+\infty}\int\int_{0}^{\infty} \Omega(\xi', \eta', z') \left[e^{-\frac{r^2}{4\nu_1 t}} - e^{-\frac{r_1^2}{4\nu_1 t}} \right] dz'\, d\xi'\, d\eta', \qquad \text{(Eq.7)}$$

where

$$r = \sqrt{(\xi-\xi')^2 + (\eta-\eta')^2 + (z-z')^2}, \qquad r_1 = \sqrt{(\xi-\xi')^2 + (\eta-\eta')^2 + (z+z')^2} \qquad \text{(Eq.8)}$$

For $t = 0$, from Eq.4 we have:

$$R^0 = u_1^0; \quad S^0 = -v_1^0. \qquad \text{(Eq.9)}$$

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The solution for S from the second equation of Eq.6 is similar to the solution 7; except that φ, R and R^0 are replaced for [illegible], S and S^0.

If it is assumed that new functions $\tilde{\varphi}$, $\tilde{R}^0$ are defined by the conditions:

$$\tilde{\varphi} = \begin{cases} +\varphi(z) & \text{for } z > 0, \\ -\varphi(z) & \text{for } z < 0, \end{cases} \qquad \tilde{R}^0 = \begin{cases} +R^0(z) & \text{for } z > 0, \\ -R^0(z) & \text{for } z < 0, \end{cases} \qquad \text{(Eq.10)}$$

then Eq.7 can be written thus:

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$$R = -\frac{1}{(4\pi\nu_1)^{3/2}} \int_{-\infty}^{+\infty}\int_0^t P(\xi,\eta,z,t-\tau)\frac{e^{-\frac{r^2}{4\nu_1\tau}}}{\tau^{3/2}}\, d\tau\, d\xi'\, d\eta'\, dz' +$$

(Eq.11)

$$+\frac{1}{(4\pi\nu_1 t)^{3/2}} \int_{-\infty}^{+\infty} R^0(\xi,\eta,z)\, e^{-\frac{r^2}{4\nu_1 t}}\, d\xi'\, d\eta'\, dz' .$$

The influence functions under the integral sign depend on t and r where r is the distance between the source and the field point.

The surfaces of equal ... to the influence functions are (at a given moment of time) spheres in the ξ, η, z coordinate system, and ellipsoids in the x, y, z coordinates.

system. Since

$$\sqrt{\frac{\nu_2}{\nu_1}} \approx 30,$$

the ellipsoid is markedly flattened vertically. Consequently the effects of pressure distribution on the wind at a given point will be of equal intensity at points horizontally 30 times further away than those distant vertically, i.e. for example, at a point distant horizontally 30 km the influence will be the same as at a point distant vertically only 1 km.

The integrals in Eqs.7 and 11 are evaluated numerically. As r increases the influence functions diminish rapidly.

2. The stationary case. Equation 5 in this case can be written in the form

$$\nu_1 \Delta u - lv = P_1, \quad \nu_1 \Delta v + lu = P_2. \qquad \text{(Eq.12)}$$

The Determination of the Wind in a Pressure Field Taking into Account the Friction of Vertical and Horizontal Mixing.

Multiplying the second equation by i, adding to the first equation and putting $u + iv = S$, $P_1 + iP_2 = \pi(\xi, \eta, z)$, we obtain from Eq.12

$$\nu_1 \Delta S + ilS = \pi(\xi, \eta, z). \qquad \text{(Eq.13)}$$

Since t does not appear in Eq.13, it is sufficient to apply the Fourier transformation with respect to x and y. Following Ref.2 we find

$$S = \frac{1}{4\pi\nu_1} \int\limits_{-\infty}^{+\infty}\int\int\limits_{0}^{\infty} \left(\frac{e^{-\sqrt{\frac{-il}{\nu_1}}\,r}}{r} - \frac{e^{-\sqrt{\frac{-il}{\nu_1}}\,r_1}}{r_1} \right) \pi(\xi', \eta', z')\,d\xi'\,d\eta'\,dz' \qquad \text{(Eq.14)}$$

where as before r and r_1 are defined by the relations given in Eq.8.

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Putting $a = \sqrt{\frac{1}{2\nu}}$, and equating in 14 real and imaginary parts, we find

$$u = \frac{1}{4\pi\nu_1} \int_{-\infty}^{+\infty}\int\int_{0}^{\infty} \left\{ P_1(\xi',\eta',z) \left[\frac{e^{-ar}\cos ar}{r} - \frac{e^{-ar_1}\cos ar_1}{r_1} \right] - \right.$$

$$\left. - P_2(\xi',\eta',z) \left[\frac{e^{-ar}\sin ar}{r} - \frac{e^{-ar_1}\sin ar_1}{r_1} \right] \right\} dz\, d\xi'\, d\eta'; \qquad \text{(Eq.15)}$$

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The Determination of the Wind in a Pressure Field Taking into Account the Friction of Vertical and Horizontal Mixing.

$$v = \frac{1}{4\pi\nu_1} \int_{-\infty}^{+\infty}\int\int_{0}^{\infty} P_1(\xi',\eta',z)\left[\frac{e^{-ar}\sin ar}{r} - \frac{e^{-ar_1}\sin ar_1}{r_1}\right] +$$

$$+ P_2(\xi',\eta',z)\left[\frac{e^{-ar}\cos ar}{r} - \frac{e^{-ar_1}\cos ar_1}{r_1}\right] dz'\,d\xi'\,d\eta' . \qquad \text{(Eq.16)}$$

(sic)

Here again the influence functions in the ξ, η, z system of coordinates are spheres, and in the x, y, z system, ellipsoids.

3. The velocity of air for a given pressure field bounded by two and three planes. It is supposed that the air is bounded from below by the plane xy, and from the side by the plane yz, and that as the air moves, it remains in contact with these surfaces. The equations of motion as before take the form of Eq.13. The solution of Eq.14 can

The Determination of the Wind in a Pressure Field Taking into Account the Friction of Vertical and Horizontal Mixing.

be written thus:

$$S = \frac{1}{4\pi\nu_1} \iiint_{-\infty}^{+\infty} \tilde{\pi}(\xi', \eta', z) \frac{e^{-\sqrt{\frac{-il}{\nu_1}}\, r}}{r} \, dz \, d\xi' \, d\eta', \qquad \text{(Eq.17)}$$

where (assuming $z > 0$)

$$\tilde{\pi}(\xi', \eta', z) = \pi(\xi', \eta', z), \; \tilde{\pi}(\xi', \eta', -z) = -\pi(\xi', \eta', z). \qquad \text{(Eq.18)}$$

For an unbounded space, in place of $\tilde{\pi}(\xi', \eta', z)$ it is necessary to write simply $\pi(\xi', \eta', z)$. The conditions 18 for the solution 17 guarantee that S vanishes on the surface xy, which was previously guaranteed in Eq.14 by Eq.8.

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The Determination of the Wind in a Pressure Field Taking into Account the Friction of Vertical and Horizontal Mixing.

If in addition to conditions 18 it is assumed that

$$\tilde{\pi}(-\xi', \eta', z) = -\pi(\xi', \eta', z), \qquad \text{(Eq.19)}$$

then on the plane yz the function S vanishes. This can also be obtained if the solution for S is written in the form of

$$S = \frac{1}{4\pi\nu_1}\int_{-\infty}^{+\infty} d\eta' \int_0^{\infty} d\xi' \int_0^{\infty} \pi(\xi', \eta', z')\left[\frac{e^{-\varkappa r}}{r} - \frac{e^{-\varkappa r_1}}{r_1} - \frac{e^{-\varkappa r_2}}{r_2} + \frac{e^{-\varkappa r_3}}{r_3}\right] dz, \qquad \text{(Eq.20)}$$

where $\varkappa = +\sqrt{\frac{-il}{\nu_1}}$;

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The Determination of the Wind in a Pressure Field Taking into Account the Friction of Vertical and Horizontal Mixing.

$$r = \sqrt{(\xi-\xi')^2+(\eta-\eta')^2+(z-z')^2}, \quad r_1 = \sqrt{(\xi-\xi')^2+(\eta-\eta')^2+(z+z')^2},$$

$$r_2 = \sqrt{(\xi+\xi')^2+(\eta-\eta')^2+(z-z')^2}, \quad r_3 = \sqrt{(\xi+\xi')^2+(\eta-\eta')^2+(z+z')^2}, \quad \text{(Eq.21)}$$

For $z=0$, $r=r_1$ and $r_2=r_3$, the expression in square brackets in Eq.20 is zero. For $\xi=0$, $r=r_2$ and $r_1=r_3$, again the expression in square brackets vanishes. Thus from Eq.20 S vanishes on the planes xy and yz.

For the case of the solid angle formed by the coordinate planes, it is necessary to add to the expression in square brackets in Eq.20 four further terms:

$$-\frac{e^{-\kappa r_4}}{r_4} + \frac{e^{-\kappa r_5}}{r_5} + \frac{e^{-\kappa r_6}}{r_6} - \frac{e^{-\kappa r_7}}{r_7},$$

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The Determination of the Wind in a Pressure Field Taking into Account the Friction of Vertical and Horizontal Mixing.

where

$$r_4=\sqrt{(\xi-\xi')^2+(\eta+\eta')^2+(z-z')^2},\quad r_5=\sqrt{(\xi-\xi')^2+(\eta+\eta')^2+(z+z')^2},$$

$$r_6=\sqrt{(\xi+\xi')^2+(\eta+\eta')^2+(z-z')^2},\quad r_7=\sqrt{(\xi+\xi')^2+(\eta+\eta')^2+(z+z')^2}.$$

Moreover zero velocities are guaranteed on all coordinate planes since:

for $z = 0$, $r = r_1$; $r_2 = r_3$; $r_4 = r_5$, $r_6 = r_7$;
for $\xi = 0$, $r = r_2$, $r_1 = r_3$; $r_4 = r_6$; $r_5 = r_7$;
for $\eta = 0$, $r = r_4$, $r_1 = r_5$, $r_2 = r_6$; $r_3 = r_7$.

This is a complete translation.

There are 3 Russian references.

Card ~~15/16~~ 15 Moscow State Univ. im. M. V. Lomonosov

PEREPELOVA, R.A.; DYUBYUK, A.F.

Calculation of vertical velocities in the warm front region. Vest.Mosk.un.Ser.mat.,mekh.,astron.,fiz.,khim. 13 no.1:97-105 '58. (MIRA 11:11)

1. Kafedra fiziki atmosfery Moskovskogo gos. universiteta. (Atmosphere)

10(4)

AUTHOR: Dyubyuk, A. F. SOV/20-123-2-15/50

TITLES: On the Hydrodynamic Forecast of the Baric and the Kinetic Field (K gidrodinamicheskomu prognozu baricheskogo i kinematicheskogo poley)
Short-Term Forecast of Weather (Kratkosrochnyy prognoz pogody)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 2, pp 266-268 (USSR)

ABSTRACT: The author bases his investigation on the system of equations of the hydrodynamics and thermodynamics of a perfect liquid by assuming an adiabatic process. This system is explicitly written down and may be transformed into a system of integro-differential equations. Both the homogeneous and the inhomogeneous system is solved by the operation method and by using the Laplace (Laplas) -Karson transformation and the Fourier (Fur'ye) transformation. It is not sufficient merely to know the initial data concerning pressure at a single instant of time if it is intended to calculate the field of pressure Q_1, but also the components of initial velocity must be known. It is, however, also possible to find a solution that depends only on the initial values of Q and on their derivatives with

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respect to time. In this case it holds that $Q = RT_0 \ln(p/p_0) + gz$; here T and p denote temperature and pressure of atmospheric air, and g denotes acceleration due to gravitation. The rather voluminous solution for Q_1 is explicitly written down. For the forecast of the pressure field it is therefore necessary to obtain data concerning pressure and its 3 derivatives with respect to time, i.e. data on pressure at 4 different instants of time. The solution mentioned supplies information concerning the propagation of damped oscillations with the velocity of sound. In the case $1/c^2 \approx 0$ (which is equivalent to $\partial \rho / \partial t \approx 0$) the development of synoptic processes is sufficiently well described by the data concerning the pressure field and by its derivatives with respect to time, or, in other words, by data concerning pressure at 2 different instances of time. (The quantity c is not defined). The aforementioned inhomogeneous system of equations is solved in the same way as the homogeneous one. The expression for the pressure field calculated for the conditions $1/c^2 \approx 0$, $\vartheta \approx 0$, in geostrophic approximation is explicitly written down. It holds that $\vartheta = T'/T_0$, $T = T - T_0$ and T_0 denotes a constant

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On the Hydrodynamic Forecast of the Baric and the Kinetic Field. Short-Term Forecast of Weather

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quantity, e.g. 273°. The initially mentioned nonlinear system of equations can be solved under the conditions already known by transforming it into a system of integro-differential equations. There are 7 references, 6 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: May 27, 1958, by V. V. Shuleykin, Academician

SUBMITTED: May 14, 1958

Card 3/3

DYUBYUK, A.F.

Taking into account the initial data of two terms in forecasting the baric field. Trudy TSIP no.93:38-48 '60. (MIRA 13:11)
(Weather forecasting)

DYUBYUK, A.F.

One method of numerical short-range pressure field forecasting and its generalizations. Trudy TSIP no.106:66-87 '60. (MIRA 13:12)
(Atmospheric pressure)

DYUBYUK, A.F.

The problem of forecasting the baric field by solving a complete system of hydromechanical equations. Izv. AN SSSR. Ser.geofiz. no.11:1642-1648 N'60. (MIRA 13:11)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova. (Weather forecasting)

DYUBYUK, A. F.; SYUY SYUAO-TSZIN' [Hsü Hsüao-chin]

Wind determination over mountains from the pressure field in case of a variable coefficient of friction in a limited and unlimited turbulent atmosphere. Izv. AN SSSR. Ser. geofiz. no.7:1078-1084 Jl '61. (MIRA 14:5)

1. Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova. (Winds)

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3.5110

S/188/62/000/002/005/013
B125/B102

AUTHORS: Dyubyuk, A. F., Berezin, V. M.

TITLE: A problem of forecasting the atmospheric pressure field

PERIODICAL: Moscow. Universitet. Vestnik. Seriya III. Fizika, astronomiya, no. 2, 1962, 36-40

TEXT: The atmospheric pressure field is forecast by solving (in geostrophic approximation) the complete system of hydrodynamic equations in a volume bounded by the coordinate planes. The problem is infinite as regards the vertical coordinate. In the atmosphere regarded as an ideal fluid, where $1/c^2 \approx 0$ (c = sonic velocity), the air masses are mainly transferred (as an adiabatic process) at geostrophic velocity with the components $\bar{U}$ and $\bar{V}$. After a passage to the coordinate system of the main current, the linearized, initial system of hydrodynamic equations in the earth-bound coordinate system furnishes a partial differential equation of the Sobolev type from which, by a Laplace-Carson transformation, one obtains

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$$\frac{\partial^2 \overline{Q}'}{\partial z^2} + \frac{p^2}{p^2 + l^2}\overline{\Delta' Q'} = \frac{1}{p^2 + l^2}\left(p^2 \Delta \overset{\circ}{Q}' + p \Delta \overset{\circ}{Q}'_t + g l^2 \frac{\partial \overset{\circ}{\vartheta}'}{\partial z}\right) = \overline{F}, \qquad (6).$$

$\overline{Q}'$, $\overline{\Delta' Q'}$, and $\overline{F}$ are mappings of functions. Moreover, $\vartheta = \vartheta'$, $Q = \overline{Q} + Q'$; $Q = RT_0 \ln(P/P_0) + gz$; g denotes gravitational acceleration, and l is the Coriolis parameter. The quantities with superscript zero denote their values at t = 0. By formulating the solution as

$$\overline{Q}' = \sum_{m=1}^{\infty} \sum_{n=1}^{\infty} A_m(\xi) B_n(\eta) D_{mn}(z),$$

$$A_m(\xi) = \sin\frac{m\pi\xi}{L_1}; \quad B_n(\eta) = \sin\frac{n\pi\eta}{L_2}. \qquad (7)$$

one obtains

$$\bar{Q}' = \sum_{m=1}^{\infty}\sum_{n=1}^{\infty}\left[-\frac{g}{\varkappa_{mn}}e^{-\varkappa_{mn}z}\,\vartheta'_{mn} - \int_0^{\infty}\bar{f}_{mn}\frac{1}{2\varkappa_{mn}}\left(e^{-\varkappa_{mn}|z-z'|} + e^{\varkappa_{mn}|z+z'|}\right)dz'\right]\times$$
$$\times \sin\frac{m\pi\xi}{L_1}\sin\frac{n\pi\eta}{L_2}, \qquad (12)$$

with

$$\bar{f}_{mn} = \frac{4}{L_1L_2}\int_0^{L_1}\int_0^{L_2}\left(\frac{p^2\Delta\hat{Q}'}{p^2+l^2} + \frac{p\Delta\hat{Q}'_t}{p^2+l^2} + \frac{gl^2}{p^2+l^2}\cdot\frac{\partial\vartheta'}{\partial z}\right)\frac{1}{2\varkappa_{mn}}\times$$
$$\times \sin\frac{m\pi\xi}{L_1}\sin\frac{n\pi\eta}{L_2}\,d\xi d\eta. \qquad (11),$$

where $\varkappa^2 = p^2d^2_{mn}/(p^2+l^2)$ with $d^2_{mn} = \pi^2\left[\left(m^2/L_1^2\right) + \left(n^2/L_2^2\right)\right]$. The extensive solution Q, obtained by inverse Laplace transformation, contains improper integrals of Bessel functions with respect to z, and of trigonometric and Bessel functions with respect to time. For a given time interval

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S/188/62/000/002/005/013
B125/B102

$\Delta t = t - t_0$, this solution can be obtained with a wide step and electronic computers.

ASSOCIATION: Kafedra fiziki atmosfery (Department of Physics of the Atmosphere)

SUBMITTED: May 22, 1961

Card 4/4

DYUBYUK, A.F.; BIBIKOVA, T.N.; TRUBNIKOV, B.N.

Effect of mountainous topography and the sea on the formation of summer clouds over the southern Crimea. Trudy UkrNIGMI no.26:74-85 '61. (MIRA 15:2)

(Crimea--Clouds)

DYUBYUK, A.F.; BIBIKOVA, T.N.; TRUBNIKOV, B.N.

Cloud characteristics for typical summer synoptical situations on the Crimean Peninsula. Trudy UkrNIGMI no.26:86-94 '61. (MIRA 15:2)

(Crimea--Clouds)

S/169/62/000/011/024/077
D228/D307

AUTHOR: Dyubyuk, A.F.

TITLE: Expedition work on the study of clouds on the Crimean coast of the Black Sea

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 11, 1962, 31, abstract 11B200 (In collection: Issled. oblakov, osadkov i grozovogo elektrichestva, M., AN SSSR, 1961, 303-317)

TEXT: The breezes on the Crimea's south coast were studied by the first expeditions to Crimea, made in the summer of 1954 and 1956 under the direction of A.Kh. Khrgian. In 1957 and 1958 the Kafedra fiziki atmosfery MGU im. M.V. Lomonosova (Department of Atmospheric Physics, Moscow State University im. M.V. Lomonosov) organized under the direction of A.P. Dyubyuk special expeditions to investigate clouds in the same area. Cloud photography and photogrammetry methods were widely applied in the expedition together with regular meteorologic and more limited aerologic observations.

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Expedition work on the study ...

S/169/62/000/011/024/077
D228/D307

Panoramic and multiple cloud surveying was carried out. Photogrammetric surveying was accomplished by means of pilot-balloon theodolites, on which ФЭД (FED) type photographic equipment was placed, with a base of 1000 m. Special TAL phototheodolites were also employed in 1958. 14 photographs of clouds are given (Cu of breeze circulation, Cu cong over protruding mountain peaks, Ac floc on a cold front, Ac lent of the Crimean bora, St and sea fog, Cb of a cold front, etc). Their outer form and meteorologic conditions are briefly described, and several cases of cloud evolution are analyzed from photogrammetric survey data.
[Abstracter's note: Complete translation]

Card 2/2

S/035/62/000/009/047/060
A001/A101

AUTHORS: Dyubyuk, A. F., Petruchuk, I. I., Trubnikov, B. N.

TITLE: Study of cirri and cumuli by means of stereophotogrammetrical ground survey with Rb-10/18 devices located on ground

PERIODICAL: Referativnyy zhurnal, Astronomiya i Geodeziya, no. 9, 1962, 21, abstract 9G136 ("Tr. Tsentr. aerol. observ.", 1962, no. 39, 92 - 109)

TEXT: The authors describe the design of an aerial camera with a stand and a synchronization system for two cameras with controlling devices. They ensure the whole pulsed operational cycle with pauses between exposures from 8 to 90 sec and divergences in the time of shutter functioning not exceeding 0.1 sec. The authors describe the normal case of ground stereophotogrammetric survey with aerial cameras with sight field angle close to 90°, a 1,631-m long base and processing of stereo-pairs on a 1818 model Zeiss stereocomparator. The results of work are presented which was performed by an expedition of the Physical Division of MGU in 1960 in studying clouds; measurement errors amounted to 2 - 3% in determinations of cloud altitude and less than 1% in determinations of cloud horizontal coordinates. It is concluded that employment of the method described makes it possible to determine spatial distribution of clouds, their development, displacements, deformation and
Card 1/2

S/035/62/000/009/047/060
A001/A101

Study of cirri and cumuli by means of...

localization relative to relief. There are 8 references.

I. Mityachkin

[Abstracter's note: Complete translation]

Card 2/2

DYUBYUK, A.F.; SEZNEVA, T.B.

Role of the pressure gradient in the development of a breeze.
Meteor. i gidrol. no.7:11-18 Jl '62. (MIRA 15:6)
(Winds)

DYUBYUK, A.F.; BEREZIN, V.M.

One problem of forecasting the field of atmospheric pressure.
Vest.Mosk.un.Ser.3.Fiz., astron.17 no.2:36-40 Mr-Ap '62.
(MIRA 16:2)

1. Kafedra fiziki atmosfery Moskovskogo universiteta.
(Atmospheric pressure) (Weather forecasting)

DYUBYUK, A.F.; BIBIKOVA, T.N.; TRUBNIKOV, B.N.

Some physical properties of orographic alto-cumulus lenticular clouds. Meteor. i gidrol. no.4:3-9 Ap '63. (MIRA 16:5)

1. Moskovskiy gosudarstvennyy universitet, fizicheskiy fakul'tet.
(Clouds)

ACCESSION NR: AT4011598 S/2789/63/000/047/0085/0095

AUTHOR: Dyubyuk, A. F.; Bibikova, T. N.; Trubnikov, B. N.

TITLE: Conditions for the formation of altocumulus lenticularis clouds in the Crimea

SOURCE: Tsentral'naya aerologicheskaya observatoriya. Trudy*, no. 47, 1963. Fizika oblakov, 85-95

TOPIC TAGS: meteorology, cloud, aerology, altocumulus cloud, lenticular cloud, aerial survey, photogrammetry, photogrammetric survey

ABSTRACT: An expedition was organized by the Kafedra fiziki atmosfery MGU (Department of Atmospheric Physics of Moscow State University) in 1957-1960 to study the conditions under which altocumulus lenticularis clouds are formed in the coastal and mountainous regions of the Crimea. The mission included a photogrammetric survey of clouds; a photographic survey of clouds with a spherical mirror, revealing the cloud cover throughout the sky; a panoramic cloud survey; and slow-motion movies of cloud movement and development. Aerial observations were supplemented by standard radiosonde and surface observations. A series of individual cases is described in detail, typical of the 51 cases studied. The synoptic situation and orographic conditions are emphasized. It is explained why such

ACCESSION NR: AT4011398

clouds are a frequent occurrence in the studied region although physical and geomorphological conditions should not favor their development. Orig. art. has: 4 figures and 3 tables.

ASSOCIATION: TSENTRAL'NAYA AEROLOGICHESKAYA OBSERVATORIYA (Central Aerological Observatory)

SUBMITTED: 00 DATE ACQ: 24Feb64 ENCL: 00

SUB CODE: AS NO REF SOV: 002 OTHER: 000

Card 2/2

DYUBYUK, A.F.; BIBIKOVA, T.N.; TRUBNIKOV, B.N.

Conditions for the formation of alto-cumulus lenticularis in the Crimean region. Trudy TSAO no.47:85-95 '63. (MIRA 16:12)

L 2565-66 EWT(1)/FCC GW
ACCESSION NR: AT5024892 UR/2531/65/000/171/0130/0143

AUTHORS: Dyubyuk, A. F.; Bibikova, T. N. 38 35

TITLE: Conditions of the formation of cloudiness as a function of orography 13+1

SOURCE: Leningrad. Glavnaya geofizicheskaya observatoriya. Trudy, no. 171, 1965. Rezul'taty issledovaniya atmosfernoy turbulentnosti na vertoletnykh trassakh (Results of the investigation of atmospheric turbulence on helicopter routes), 130-143

TOPIC TAGS: cloud formation, cloud physics, orography, meteorologic observation

ABSTRACT: Observations of the conditions for development and growth of clouds (and their interpretation in terms of the heterogeneity of the earth's surface) have been studied in the mountainous regions of southern Crimea. Such information is important in predictions of cloud formations representing danger to helicopter and airplane flights. Complex photographic methods used in the study included surveys with photographic cameras of various systems, panoramic photography, simultaneous photography of the total horizon on one frame by means of a spherical mirror, photogrammetric survey for determining spatial coordinates of the clouds,

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